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Study Made of Relationship Between Growth and Metabolism in X-Irradiated Seeds

A study has been made of the relationship between the growth and metabolism of X-irradiated sunflower seeds. The investigation was conducted to determine the radiation induced changes which are directly related to, or indicative of, both the embryo and the cotyledons in radiosensitized seeds.

The relationship was determined by the use of lipoxidase activity as an index to cotyledon metabolism and hypocotyl growth as an index to the radiosensitivity of the embryo.

The growth was found to be inversely related to the metabolism; however, the actual magnitudes of the relation between the two differed for various ranges of X-ray exposure. Growth was reduced by doses of up to 100kR, but the enzyme activity remained relatively stationary. Metabolism and growth both were reduced in the range of 100 to 400kR, and above 400kR both completely ceased.

The results suggested that the X-rays affected the embryo (the primary radiosensitive locus). The amount of injury to the embryo was reflected in the hypocotyl growth, and this growth process ultimately determined the levels of metabolism in the cotyledons at various stages of the seedling development.

The embryo and cotyledons were found to independently initiate physiological activities. Normal hypocotyl growth in the seed was inhibited close to the minimal growth level with exposures of only 60kR. Seven times as much radiation was required to stop

the initiation of lipoxidase metabolism in the cotyledons.

Notes:

1. This information, the result of a research study, should be of interest to geneticists and horticulturists.
2. Additional information may be found in: *Radiation Research*, 25, 1966, pp. 470-479; and *Plant Physiology*, 39, 1964, pp. 65-70.
3. Inquiries concerning this innovation may be directed to:

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Reference: B67-10604

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Patent status:

Inquiries about obtaining rights for commercial use of this innovation may be made to:

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